Parker Chomerics

TEST SERVICES

SHIELDING EFFECTIVENESS
COMPRESSION VS DEFLECTION
COMPRESSION VS RESISTANCE
COMPRESSION SET
EVALUATION OF
PARKER CHOMERICS
SOFT-SHIELD® 3500, 3700 AND 5000 EMI GASKETS

Date: **AUGUST 19, 2020**
Test Report Number: **SR7286.19 REVISION 1**

IN ACCORDANCE WITH
CHO-TM-TP08
ASTM D 575
ASTM D 3574

Prepared For: **PARKER CHOMERICS**
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ATTENTION: APPLICATIONS ENGINEERING

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TABLE OF CONTENTS

REVISION RECORD SHEET

Revision	Description	Date	Approval
--	Created Test Report	2019-02-05	--
Rev 1	Corrected ASTM D 257 Reference to ASTM D 575	2020-08-19	

The latest revision of the report is valid, all prior revisions are superseded.

1.0 GENERAL

1.1 Introduction

1.1.1 Purpose

This document is written to report the results of tests performed on Parker Chomerics Soft-Shield EMI/EMC Gasket Materials.

The Parker-Chomerics Gasket materials tested are as follows:

Soft-Shield 3500
Soft-Shield 3700
Soft-Shield 5000

The purpose of this testing effort was to create test data to support the substitution of Soft-Shield 5000 with Soft-Shield 3500 and 3700 due to the discontinuation of Soft-Shield 5000 product.

The tests were performed November, 2018 through January, 2019.

1.1.2 Requirements

The intent was to compare similar gasket profiles from each of the Soft-Shield materials under side by side testing and methods. All testing was performed under the same test setup, test method and process.

Testing was accomplished for the following;

Shielding Effectiveness to CHO-TM-TP08
Compression Deflection to ASTM D 575
Compression Resistance to ASTM D 575
Compression Set to ASTM D 3574

1.1.3 Test Locations

The tests were performed at Chomerics Inc., Woburn, Massachusetts. The Shielding Effectiveness Tests were performed in Parker Chomerics Test Services Department. The Compression Deflection, Compression Resistance and Compression Set tests were performed in the Chomerics Physical Test Lab (PTL).

1.3 Administrative Data

1.3.1 Test Facility

Chomerics Test Services operates under the current revision of Chomerics Quality Assurance (QA) Manual Document Number QA002.

The QA Manual has been constructed to reflect a quality program in accordance with the requirements of the National Institute of Standards and Technology (NIST), ISO 9002, ISO Guide 25, NIST Handbook 150, EN 45001, MIL-I-45208A, MIL-STD-461E, 462D and Chomerics Quality Assurance Program (QAP).

The QA Manual outlines and describes the procedures for establishing and maintaining the quality of analysis, research, inspection, and testing within Chomerics Test Service (CTS).

Shielding Effectiveness measurements performed for this test are traceable to the National Institute of Standards and Technology (NIST) based on the fact that all test equipment used for the measurements was previously calibrated using standards traceable to NIST.

The system amplitude accuracy for the measurements made during the shielding effectiveness tests was ±3dB.

The Physical Test Lab Accreditation falls within Parker-Chomerics ISO accreditation.

1.3.2 Equipment Calibration

The calibration of Chomerics Test Services equipment is controlled under the current edition of Chomerics Laboratory Test Equipment Calibration Manual Document Number QA001.

The test equipment used throughout this test sequence conforms to laboratory calibration standards, MIL-STD-45662, traceable to the National Institute of Standards and Technology.

Test Equipment used in the Physical Test Lab conforms to laboratory calibration standards, MIL-STD-45662, traceable to the National Institute of Standards and Technology.

All test equipment is calibrated in one year intervals. Calibration information is listed within the Test Sections where applicable.

1.3.3 Gasket Sample(s) Under Test

Gasket profiles selected for test cover the three different cross section styles in sizes that are small, medium, and large where appropriate. In addition, profiles were selected that closely match between the different Soft-Shield materials to achieve the best data comparison. Not as many different profiles of Soft-Shield 3700 are available. A cross section of profile samples were selected to best represent the material performance and general comparison.

The test samples provided for testing are as follows:

Soft-Shield 3500 and Soft-Shield 5000 Test Samples

						Test Service	PTL			Shim Size for SE Test	
Test Series	Profile	SS3500 Part Number	Size	SS5000 Part Number	Dimensions Inches	SE	Compression Deflection	Resistance Deflection	Compression Set	25% Inches	50% Inches
#1	Square		Small	82-122-74018-02400	0.118 x 0.118	1A/1B	1C	1D	Table 1 and 2	0.085	0.060
#2	Square	77-12-3150-02400	Medium	82-122-74024-02400	0.375 x 0.375	2A/2B	2C	2D	Table 1 and 2	0.280	0.185
#3	Square	77-12-3176-02400	Large	82-122-74028-02400	0.500 x 0.500	3A/3B	3C	3D	Table 1 and 2	0.375	0.250
#4	D-Shape	77-12-3607-02400	Small	82-122-74037-02400	0.060 x 0.150	4A/4B	4C	4D	Table 1 and 2	0.045	0.030
#5	D-Shape	77-12-3622-02400	Medium	82-122-74074-02400	0.118 x 0.354	5A/5B	5C	5D	Table 1 and 2	0.085	0.060
#6	D-Shape	77-12-3667-02400	Medium	82-122-74058-02400	0.140 x 0.380	6A/6B	6C	6D	Table 1 and 2	0.100	0.070
#7	D-Shape	77-12-3626-02400	Medium	82-122-74011-02400	0.250 x 0.375	7A/7B	7C	7D	Table 1 and 2	0.185	0.125
#8	D-Shape	77-12-3643-02400	Large	82-122-74029-02400	0.375 x 0.500	8A/8B	8C	8D	Table 1 and 2	0.280	0.185
#9	Rectangle	77-12-3173-02400	N/A	82-122-74012-02400	0.125 x 0.500	9A/9B	9C	9D	Table 1 and 2	0.090	0.062

Soft-Shield 3700 Test Samples

						Test Service	PTL			Shim Size for SE Test	
Test Series	Profile	SS3700 Part Number	Size	N/A	Dimensions Inches	SE	Compression Deflection	Resistance Deflection	Compression Set	25% Inches	50% Inches
#10	Square	37-131-1044-02400	Large	N/A	0.512 x 0.512	10A/10B	14	15	Table 3	0.384	0.256
#11	Rectangle	37-131-1024-02400	Small	N/A	0.105 x 0.157	11A/11B	14	15	Table 3	0.080	0.050
#12	Rectangle	37-131-1027-02400	Medium	N/A	0.137 x 0.197	12A/12B	14	15	Table 3	0.100	0.070
#13	Rectangle	37-131-1041-02400	Large	N/A	0.387 x 0.394	13A/13B	14	15	Table 3	0.290	0.190

2.0 TESTS PERFORMED

2.1 Radiated Electric Field and Plane Wave Shielding Tests

The following is a general description of the test setup used for shielding effectiveness testing according to Chomerics CHO-TM-TP-08 Test Method.

2.1.1 Equipment Used

Test Equipment		Asset #	Serial #	Last Cal Date
X	Ophir 5060 Amplifier	Rental	1004	NCR
X	HP 8341B Signal Generator	105	2650A00418	UWC
X	Agilent 4440A Spectrum Analyzer	704	US41421236	02/2018
X	Amplifier Research Amplifier 30W Amp	480	15657	NCR
X	EMCO 3109 Biconical Antenna	87	2123	04/2018
X	EMCO 3109 Biconical Antenna	82	2054	02/2018
X	Singer CLS-105 Log Spiral Antenna	83	00315-5007	UWC
X	Singer CLS-105 Log Spiral Antenna	89	00316-4780	UWC
X	EMCO 3115 Double Ridge Guide Antenna	282	2345	NCR
X	EMCO 3115 Double Ridge Guide Antenna	375	2175	01/2018

2.1.2 Test Method

Figure 1 illustrates the shielded enclosure used for the shielding effectiveness testing.

Chomerics' Shielding Effectiveness Lab, if used for this test program, is located within the Seeger Building at Chomerics, 84 Dragon Court, Woburn, Massachusetts. This shielded enclosure was manufactured by Sprague Shielding Corporation. The main test chamber is 12 x 16 x 8 feet in size with an adjacent enclosure on the back side which is 8 x 12 x 8 feet in size. Attenuation tests have demonstrated that the shielded enclosure meets the attenuation requirements of IEEE-STD-299.

Support equipment used for signal transmit, such as amplifiers and signal generators, were located outside the shielded enclosure. The transmit antenna is located inside the shielded enclosure on the left side. The detection system (Receive) was located inside the shielded enclosure in the right side.

The gasket test sample was located on the common wall between the two halves of this shielded enclosure.

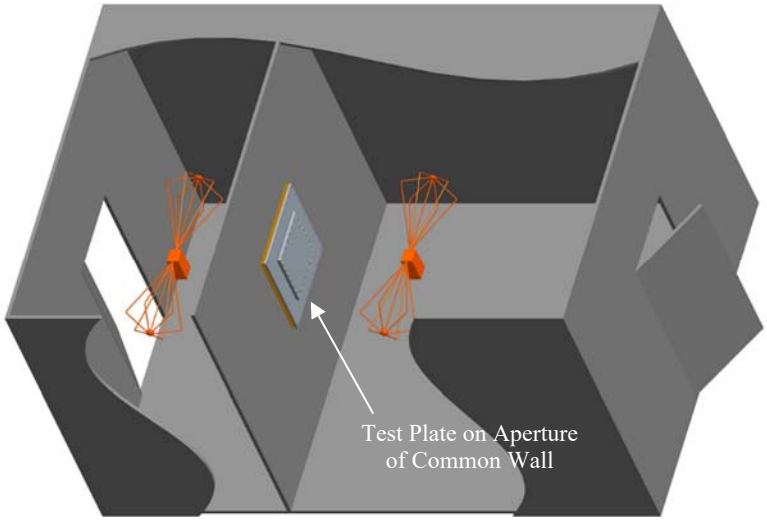


FIGURE 1

It's important to note that plastic bolts are used for this test. There is no electrical connection between the cover plate and the brass frame (shielded enclosure) other than what is provided through the actual gasket under test.

Chomerics Test Method CHO-TM-TP-08 follows the general principles of IEEE-STD-299 with one exception. The one exception is that the Open Reference measurement is taken by transmitting the signal through the open aperture, not in free space as defined by IEEE-STD-299. This change in testing takes out many of the shielded enclosure effects (resonances) and puts more focus on the performance of the actual gasket under test.

During the shielding effectiveness test, the test sample(s) (Soft-Shield) were mounted on a brass test fixture seam welded to the common wall of the shielded enclosure. In all cases, the gasket was mounted on the frame inboard of the bolt holes. The open aperture is 24 inches square. The flange is one inch wide and the cover plate is 26 inches square. The cover plate was placed over the test sample and bolted in place using plastic bolts to deflect the gasket 25% or 50%. The gasket is first tested using plastic shims sized to deflect the gasket 25% and then the shims were replaced with shims sized to deflect the gasket 50%.

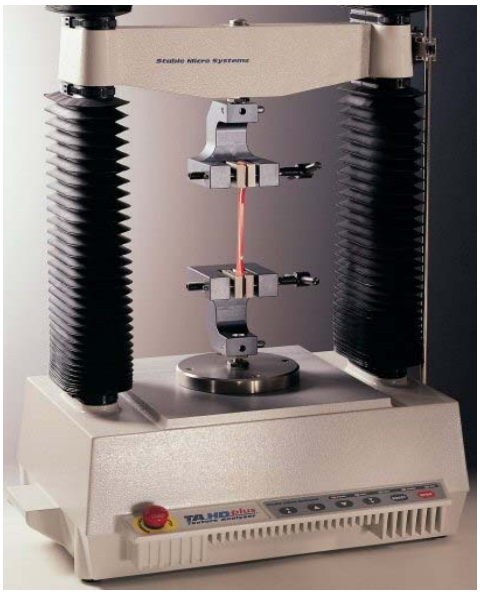
The tests were performed at frequencies of 30MHz, 40MHz, 60MHz, 80MHz, 100MHz, 200MHz, 400MHz, 600MHz, 800MHz, 1GHz, 2GHz, 4GHz, 6GHz, 8GHz, 10GHz. Testing over this frequency range covers an adequate frequency range for comparison of materials.

2.2 Compression Deflection and Resistance Tests

The following is a general description of the test setup used for Compression-Deflection and Compression- Residence testing according to the ASTM D 575 Test Method.

2.2.1 Equipment Used

The TA-HD*Plus* Texture Analyzer from Texture Technologies with Ag plated probe and lower disk was used for testing.



2.2.2 Test Method

The test samples were conditioned for at least 3 hours at ambient room temperature (23°C +/- 5 & 50% R.H.) This was done before or after cutting the sample.

Three samples were cut per batch, making sure there were no visible imperfections within the sample. For Linear profiles, such as Soft-Shield materials, one inch long samples were created.

A dampened IPA cloth was used to wipe the electrode surface clean. Testing did not begin until all solvent evaporated from the surface. The leads were connected to the Ag plated probe and disc as shown in the picture below.

The probe, probe height, and bend deflection were calibrated via software. Each sample was centered under the probe. The probe was brought down until just above the sample, but not touching. The test parameters were entered into the software (typical test speed is 0.025 in/min up to 70% compression or load cell maximum of 50 kg for soft materials and 750 kg for other materials).

For electrically conductive materials, two Excel graphs were made:

Compression [lbs per linear inch or psi] versus % Deflection
Resistance [mOhms] versus % Deflection.

2.3 Compression Set Tests

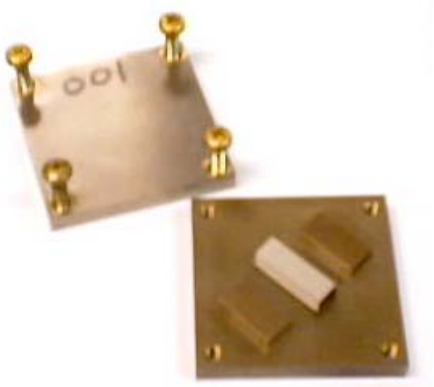
2.3.1 Equipment Used

The compression set test was performed to determine the ability of a material to recover after being compressed for 22 hours at 70°C in accordance with ASTM D 3574.

2.3.2 Test Method

A Compression set flange and Shim stock of varying thicknesses was used for testing along with a hand held sample thickness micrometer accurate to 0.001” as the measuring device.

The same TA-XT*Plus* Texture Analyzer from Texture Technologies was used for testing with a 1” x 1” probe.



The test samples were conditioned for at least 3 hours at ambient room temperature (23°C +/- 5 & 50% R.H.) This was done before or after cutting the one inch long sample. Verified that there were no visible imperfections within the sample. A dampened IPA cloth was used to wipe flanges clean, if needed. Testing did not begin until all solvent evaporated from the surface. For samples with PSA tape, the release liner was removed and the sample placed on a piece of mylar with known thickness (making sure piece of mylar was large enough to go under shims as well as sample - ~2" x 2").

Measure initial sample thickness (t_o) using the measuring device. Calibrate probe, probe height (with mylar if applicable) and bend deflection via software. Center the sample under the probe and bring the probe down until just above the sample, but not touching. Enter parameters into software. (Typical test speed is 0.025 in/min up to 50 grams compression with a trigger force of 25 grams). Run 'test' to obtain Product Height of the initial height t_o.

Using a hand-held micrometer, several measurements on were taken on the sample, being careful to use minimal force so as not to compress the foam. 50% of the initial height was calculated; this is the Compressed Height. Using any combination of shim stock, this thickness was obtained. Two shims were made. The sample was centered on the compression set flange. The set of shim stock was placed at the desired thickness on either side of the sample (making sure the shims were placed on the mylar if applicable). The top flange was placed on the sample and the assembly on all four corners was tightened.

The flange was placed in the 70°C oven for 22 hours. The flange assembly was removed from the oven, taken apart, and allowed to sit for 30 minutes minimum. The final thickness ($t_{f)}$ of the sample was measured using the same method as was above.

The compression set was calculated according to ASTM method D3574 Test D constant deflection compression set based on original thickness;

$$C_t = [(t_o - t_f)/t_o] \times 100$$

Where: C_t = compression set expressed as a percentage of the original thickness
t_o = original thickness of test specimen
t_f = final thickness of test specimen

2.4 Test Results and Recommendations

Both Soft-Shield 3500 and Soft-Shield 3700 are effective substitutes for Soft-Shield 5000.

All test results are included in Section 2.5.

Direct comparison of test data was done for Soft-Shield 3500 and 5000 due to the fact that very similar profiles exist. Although the Soft-Shield 3700 profiles were plotted on separate pages, they can still be compared to the Soft-Shield 3500 and 5000 graphs. However, care must be taken to pay attention to the different profile sizes.

For review of Shielding Effectiveness data, it is important to remember that the test plate and the shielded room have no electrical connection other than what is through the gasket material. In addition, the reference measurement (Open Reference) is done by transmitting the signal through the open aperture on the shielded room common wall (see Section 2.1.2). This is important to understand when reviewing the SE test data and the following paragraphs.

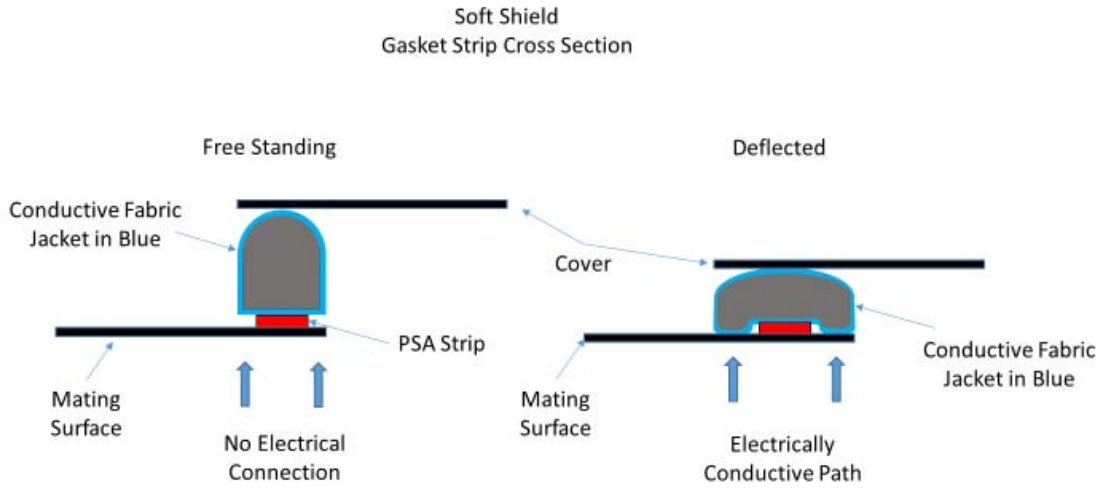
The Shielding Effectiveness testing was done at 25 and 50% deflection set for each individual gasket profile. There are a number of cases where low DC electrical conductivity is not achieved until the deflection of the profile is 25% or more. To see the impact of electrical continuity and gasket deflection, refer to the associated Deflection vs Resistance graphs throughout Section 2.5. As an example, the profile tested in Test Series #1 did not achieve low DC electrical conductivity until it is deflected >/= 35% for SS5000 and >/= 45% for SS3500 (Graph 1D). However, both gaskets still exhibited shielding effectiveness between 25 and 50dB depending on the frequency point. This is due to the fact that the cover plate is in place over the aperture AND the gasket is present between the cover and the shielded room flange. The GAP around the perimeter is then approximately only the thickness of the PSA strip (0.005 inch, 0.127mm) on the gasket profile.

Once the gasket deflection achieves a low DC electrical conductivity (>/= 35% for SS5000 and >/= 45% for SS3500) the shielding effectiveness increases to between 60 and 100dB depending on the frequency point.

The reason the gasket does not achieve low DC electrical conductivity until it is deflected to this extent is due to the overall profile size compared to the width of the PSA strip. The gasket tested in Series #1 is the best example of this phenomena where the gasket size is only 0.118 wide (2.99mm) by 0.118 inch (2.99mm) tall and the PSA strip is 0.078 inches (1.98mm) wide.

Proper deflection optimizes the ability of the conductive fabric on the gasket to OVERCOME the PSA strip thickness and width. This effect is due to the fact that electrical conductivity is achieved by connection of the gasket jacket material to the mating surface AT THE SIDES of the PSA strip as shown in the following picture.

FIGURE 2



This phenomena diminishes for a gasket that is significantly wider than the PSA strip such at shown for Test Series #2 and Graph 2D. Comparing Shielding Effectiveness between 25 and 50% deflection is almost equivalent.

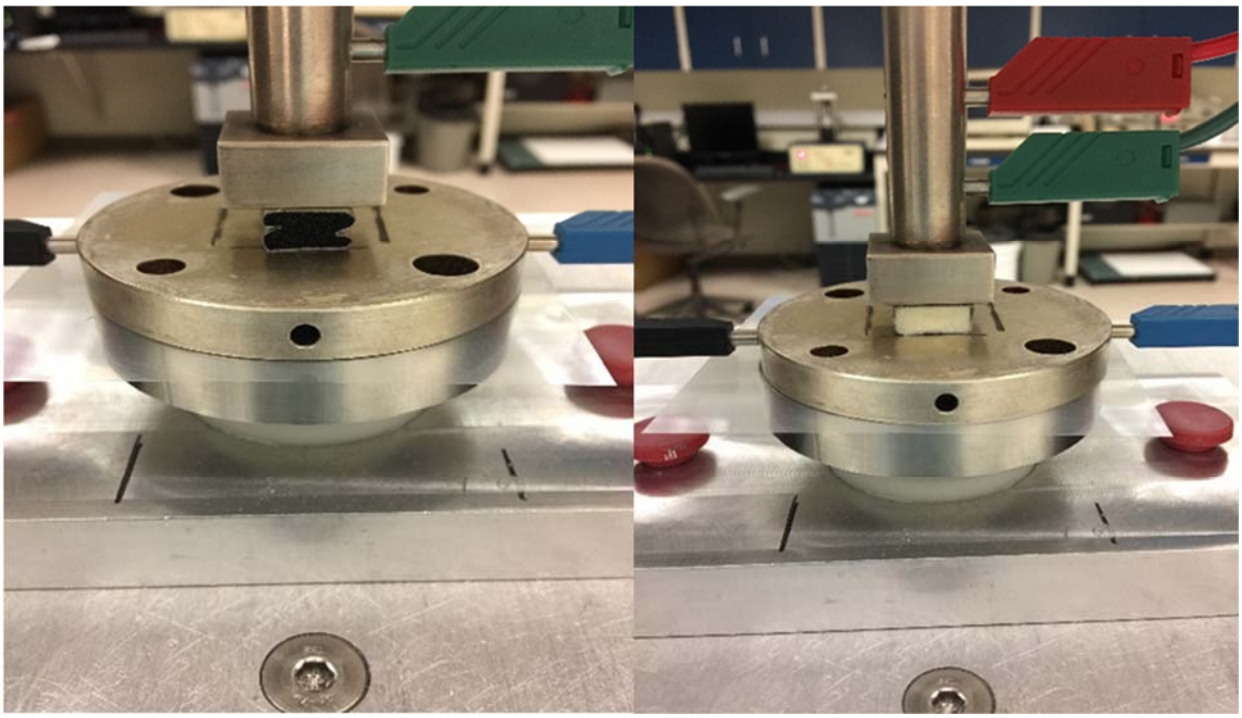
It's also important to note that the compression deflection characteristics of the different Soft-Shield materials varies due to the foam and fabric used.

For the purpose of this evaluation, only DC conductivity is provided and not Impedance or Transfer Impedance over the frequency range. The Compression vs Resistance test can be done for DC conductivity and not Impedance. DC electrical conductivity is not an indicator of Shielding Effectiveness however, it does provide a general indicator of the electrical connection of the gasket material and the mating surfaces.

It must also be pointed out that the mating surfaces for all tests performed in this evaluation are bare aluminum and brass for Shielding Effectiveness and Silver plating for DC Deflection vs Conductivity tests. These surface treatments have been found to best provide consistent and repeatable tests. This evaluation did not take into account other surface treatments such as conversion coatings (iridite). The end user should take the surface treatment into account in the end application.

With regard to Compression Deflection, most of the profiles have very similar test data for profiles which are very close in size.

One interesting characteristic is evident from review of the Compression Deflection test data. This is the “knee” in the compression deflection curve where the pressure increases early in the deflection range and then levels off as deflection increases (Graph 2C and 3C). The effect is shown in the pictures below. The Soft-Shield 3500 profile deflects into an hourglass shape (left) and the Soft-Shield 5000 retains a square shape.



Soft-Shield 3500 Profile 3176 Soft Shied 5000 Profile 74028

Even with this effect, the test results still show that at any point in the compression deflection curve the shielding effectiveness of Soft-Shield 3500 profile exceeds that of the Soft-Shield 5000 profile. In addition, the compression force at the 25 and 50% deflection points are within 1.5 lbs/linear inch. This difference is typically considered insignificant and in most applications the pressure is less for the Soft-Shield 3500 profile.

The Compression Deflection and Compression Resistance data for the Soft-Shield 3700 test is illustrated on Graph 14 and 15 respectively. The Compression Deflection data is very similar in comparison to the Soft-Shield 3500 and Soft-Shield 500 profiles of similar shape. As with the Soft-Shield 3500 and 5000 the shielding effectiveness is affected by the PSA strip. The Soft-Shield 3700 profiles #1024 and #1027 both did not achieve low electrical resistance until they were deflected > 25% (Graph 15). The effect of this on shielding effectiveness is illustrates on Graph 10A and 11A where the shielding effectiveness is lower for the deflection of 25%. The Soft-Shield 3700 profiles #1044 and #1041 both achieved low electrical resistance very early in the deflection range < 25% (Graph 15). As a result, the shielding effectiveness for each profile at 25% and 50% are equivalent (Graph 12A and 13A).

The Compression Set test data for all profiles is outlined in Tables 1, 2 and 3. Two samples of each of the profiles were tested. With regard to Compression Set, the best Soft-Shield material is the Soft-Shield 3700.

In most cases, the compression set increased as the size of the profile decreased. Very small profiles had the largest Compression Set.

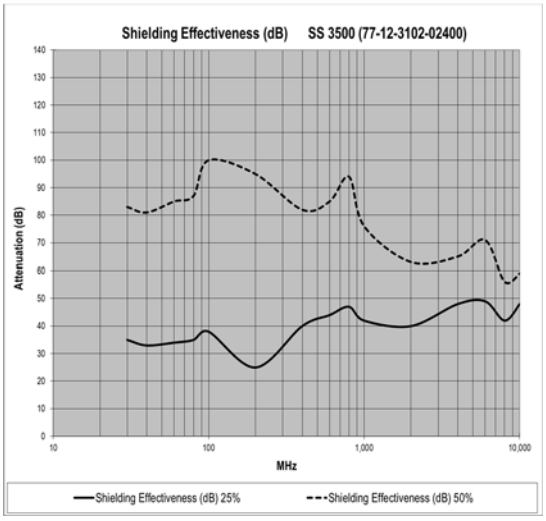
When directly comparing Soft-Shield 3500 to Soft-Shield 5000, the Compression Set of Soft-Shield 5000 is slightly less than the Soft-Shield 3500 material but in most applications the difference is considered insignificant.

One interesting characteristic is evident from review of the Compression Set test data. The Soft-Shield 3500 Profile #3102 had significantly more Compression Set than the similar profile in Soft-Shield 5000 (#74018). Unlike the other profiles of Soft-Shield 3500 (SS3500) which have been shown to take only a very slight set after the compression set test (approximately 5% max), SS3500 profile 77-1X-3102-02400 shows a compression set of over 20%. The Soft-Shield 5000 (SS5000) counterpart profile to this (82-122-74018-02400) which was tested alongside measured in at a higher compression set than any other SS5000 sample that was tested in this Comparison Testing Plan. Due to the small amount of foam present in these profiles it was concluded that these very small profiles are not a good candidate for Compression Set testing. In addition, these profiles are very seldom used.

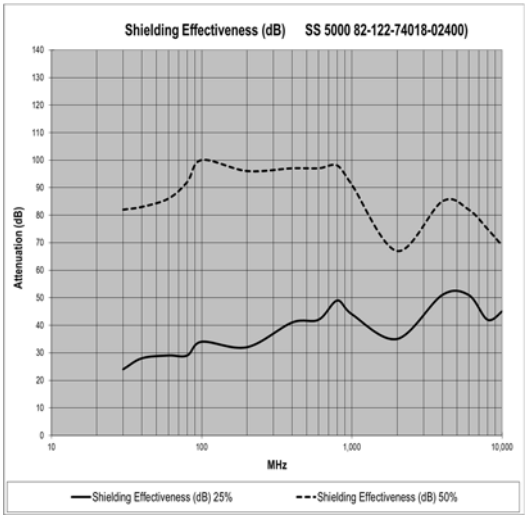
2.5 Test Data

Test Data – Test Series #1

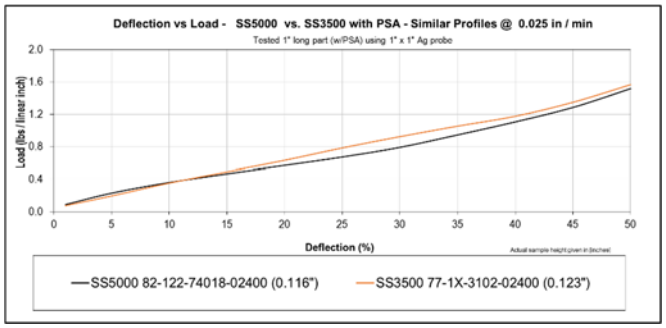
Graph 1A - Shielding Effectiveness
Soft-Shield 3500
P/N 77-12-3102-02400



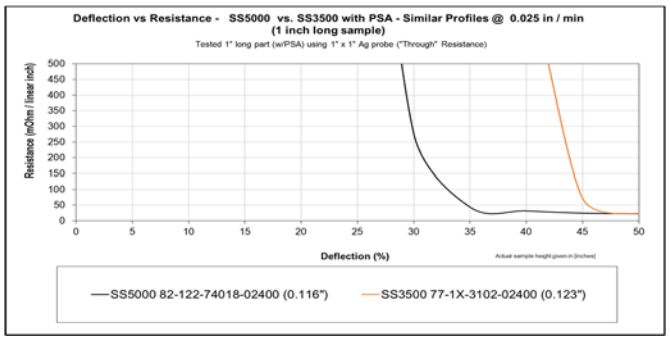
Graph 1B - Shielding Effectiveness
Soft-Shield 5000
82-122-74018-02400



Graph 1C - Compression – Deflection Comparison

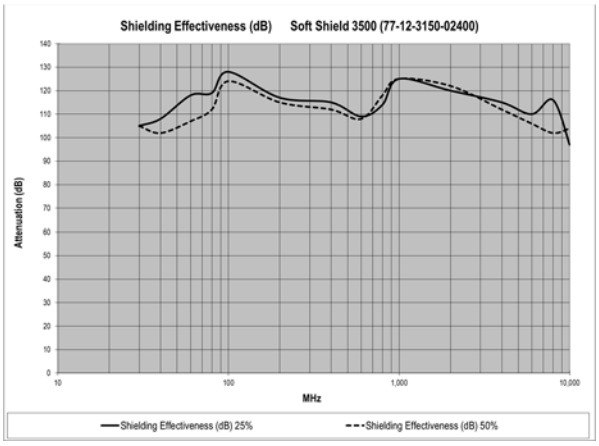


Graph 1D - Deflection vs Resistance Comparison

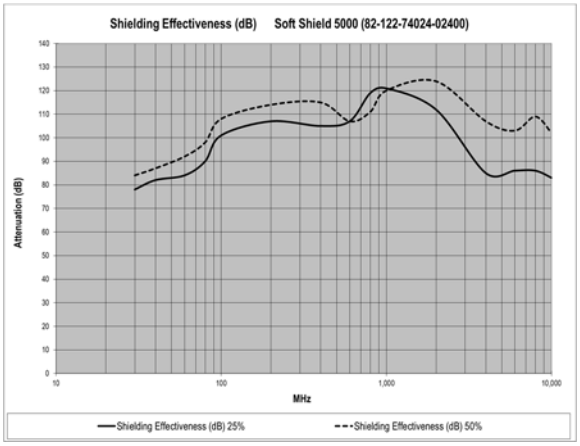


Test Data – Test Series #2

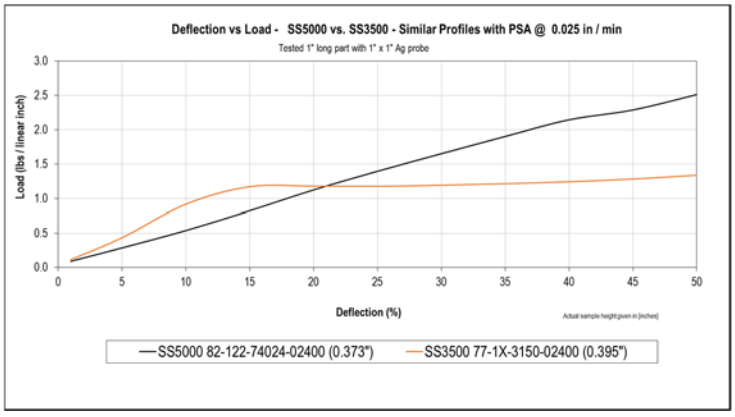
Graph 2A - Shielding Effectiveness
Soft-Shield 3500
P/N 77-12-3150-02400



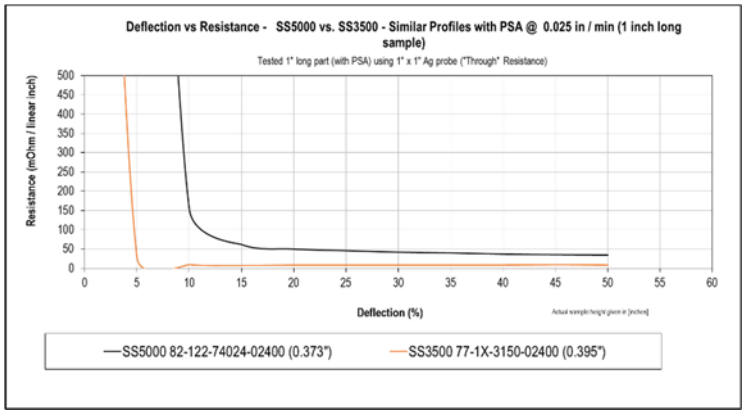
Graph 2B - Shielding Effectiveness
Soft-Shield 5000
P/N 82-122-74024-02400



Graph 2C - Compression – Deflection Comparison

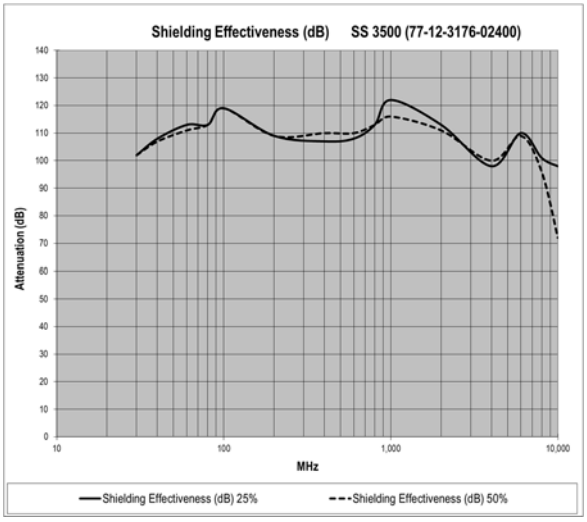


Graph 2D - Deflection vs Resistance Comparison

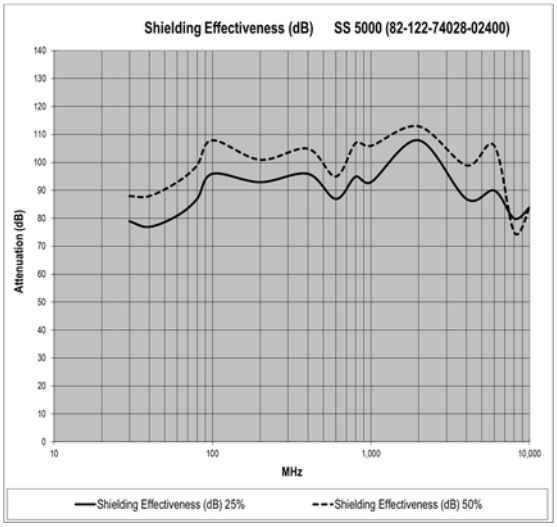


Test Data – Test Series #3

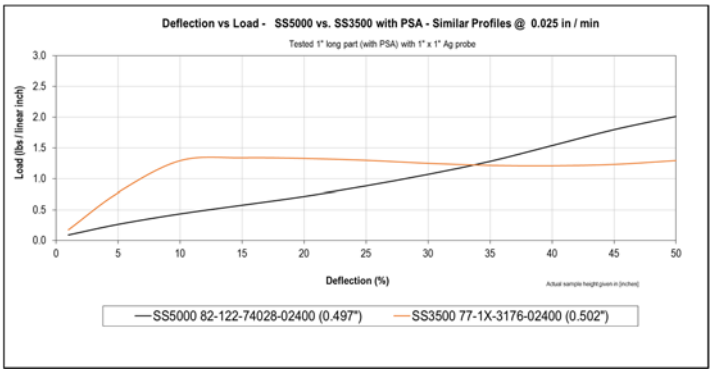
Graph 3A - Shielding Effectiveness
Soft-Shield 3500
P/N 77-12-3176-02400



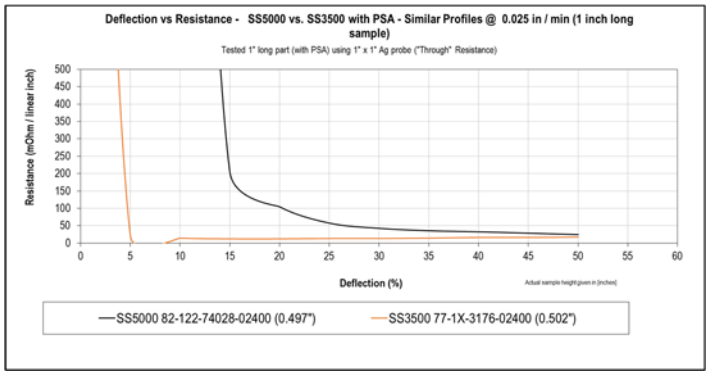
Graph 3B - Shielding Effectiveness
Soft-Shield 5000
P/N 82-122-74028-02400



Graph 3C - Compression – Deflection Comparison

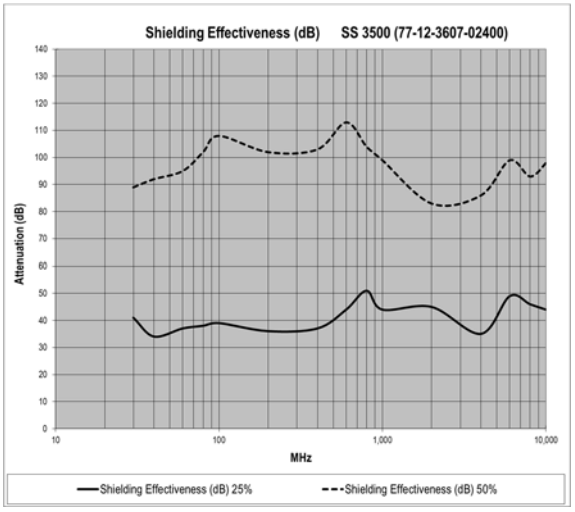


Graph 3D - Deflection vs Resistance Comparison

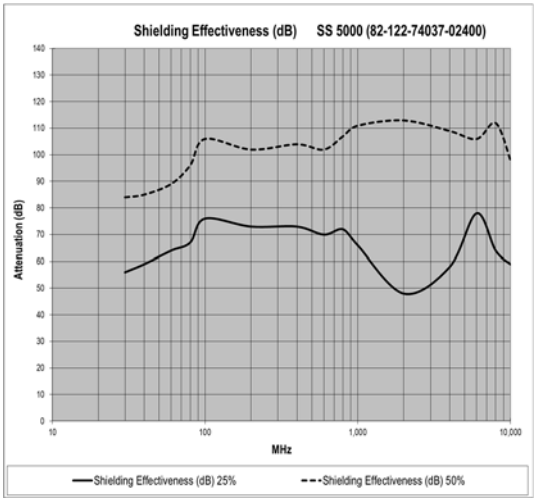


Test Data – Test Series #4

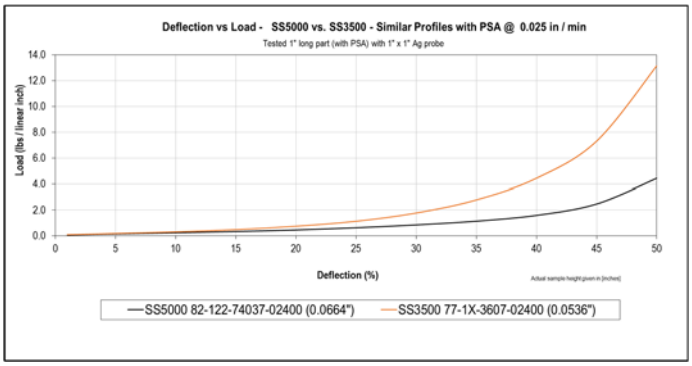
Graph 4A - Shielding Effectiveness
Soft-Shield 3500
P/N 77-12-3607-02400



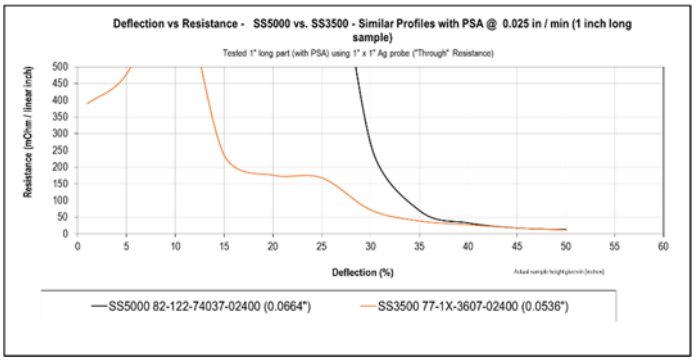
Graph 4B - Shielding Effectiveness
Soft-Shield 5000
P/N 82-122-74037-02400



Graph 4C - Compression – Deflection Comparison

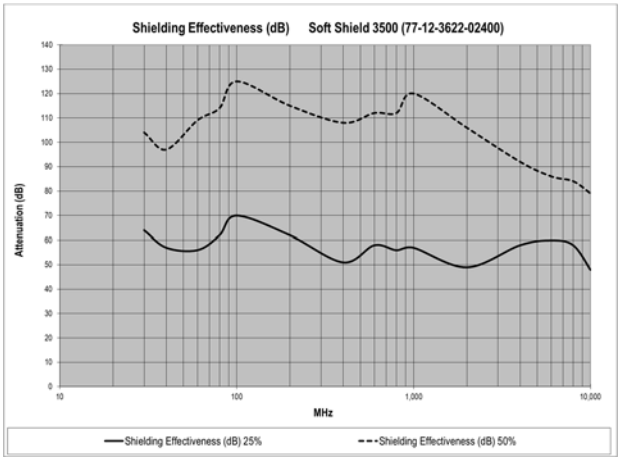


Graph 4D - Deflection vs Resistance Comparison

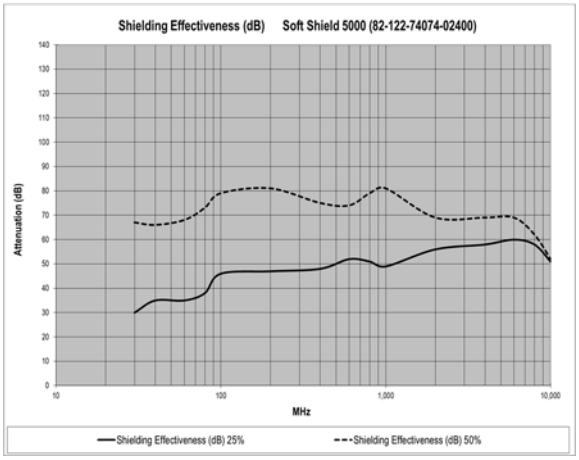


Test Data – Test Series #5

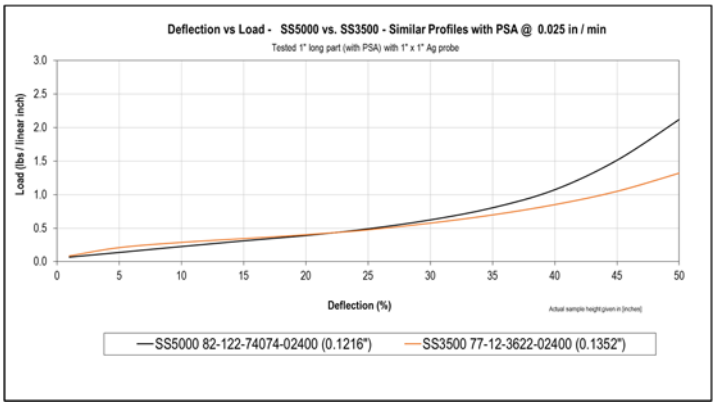
Graph 5A - Shielding Effectiveness
Soft-Shield 3500
P/N 77-12-3622-02400



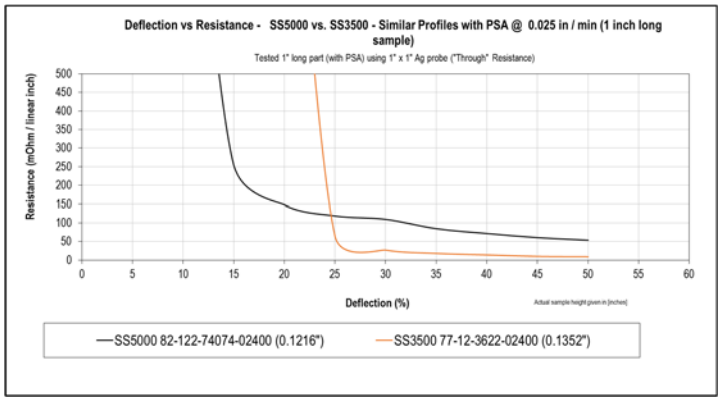
Graph 5B - Shielding Effectiveness
Soft-Shield 5000
P/N 82-122-74074-02400



Graph 5C - Compression – Deflection Comparison

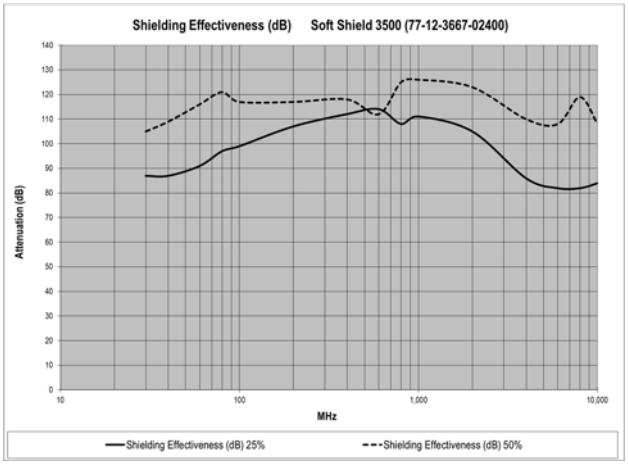


Graph 5D - Deflection vs Resistance Comparison

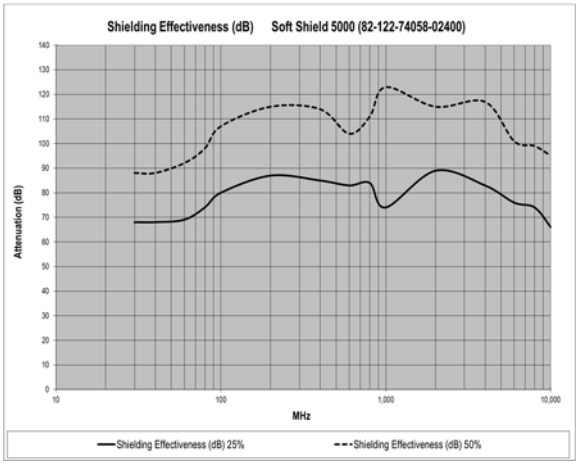


Test Data – Test Series #6

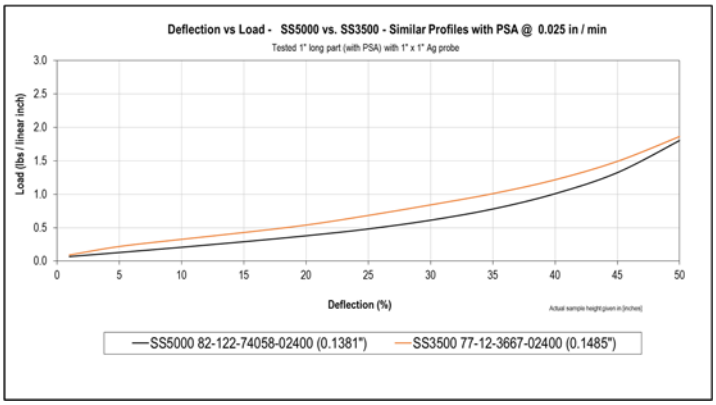
Graph 6A - Shielding Effectiveness
Soft-Shield 3500
P/N 77-12-3667-02400



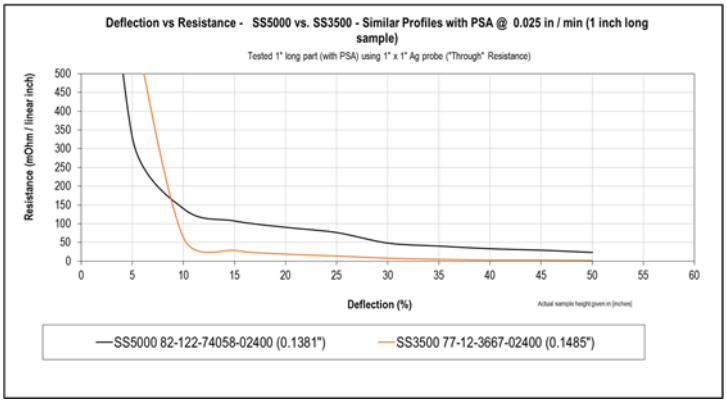
Graph 6B - Shielding Effectiveness
Soft-Shield 5000
P/N 82-122-74058-02400



Graph 6C - Compression – Deflection Comparison

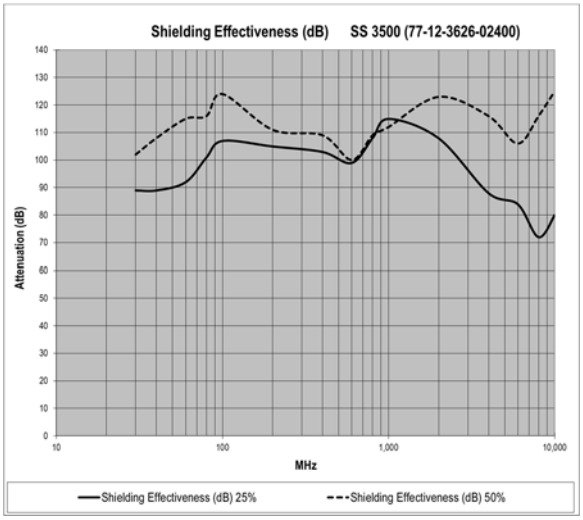


Graph 6D - Deflection vs Resistance Comparison

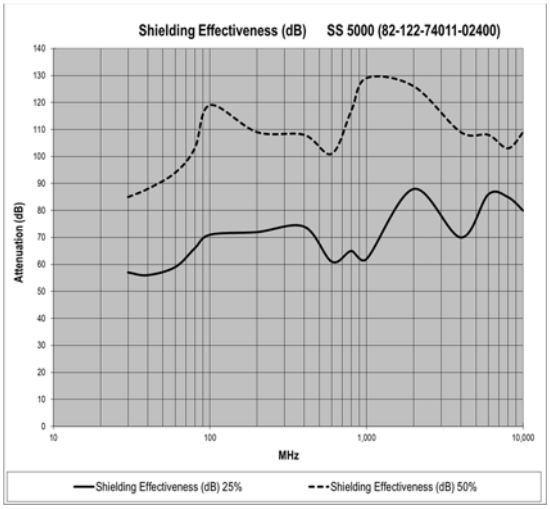


Test Data – Test Series #7

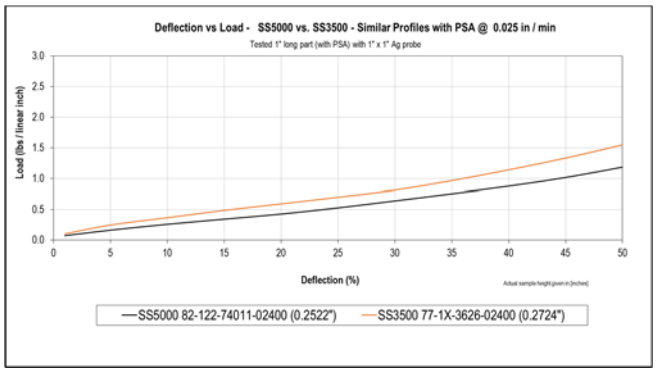
Graph 7A - Shielding Effectiveness
Soft-Shield 3500
P/N 77-12-3626-02400



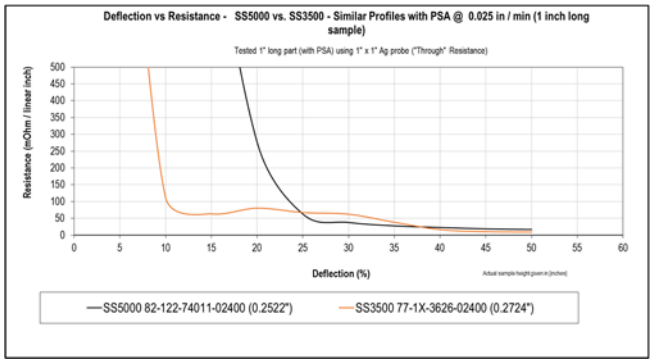
Graph 7B - Shielding Effectiveness
Soft-Shield 5000
P/N 82-122-74011-02400



Graph 7C - Compression – Deflection Comparison

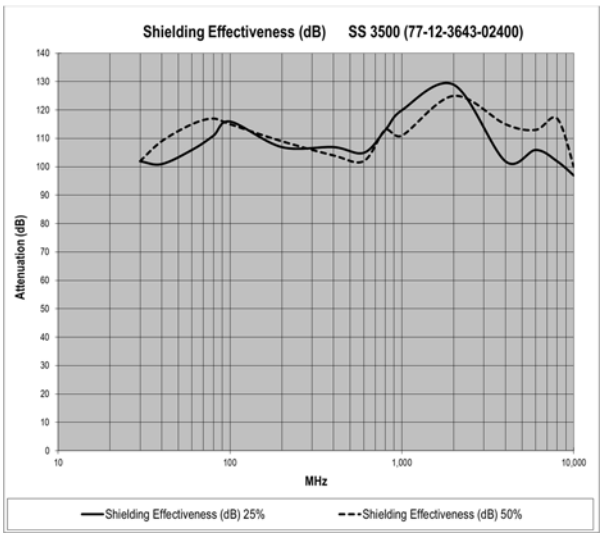


Graph 7D - Deflection vs Resistance Comparison

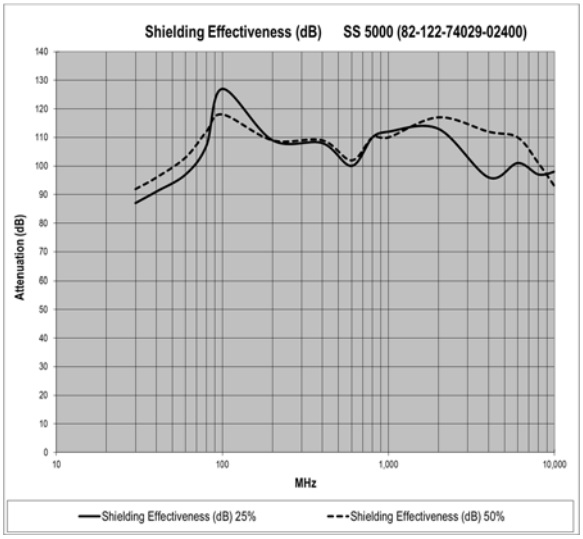


Test Data – Test Series #8

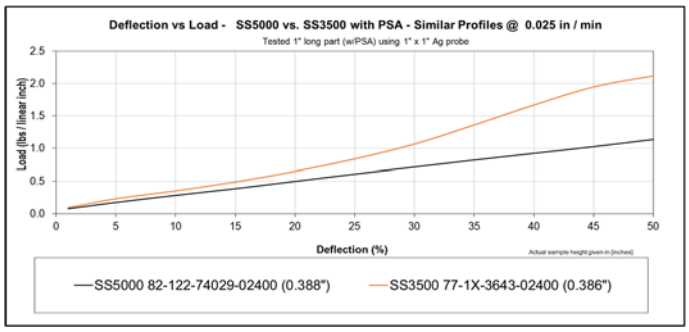
Graph 8A - Shielding Effectiveness
Soft-Shield 3500
P/N 77-12-3643-02400



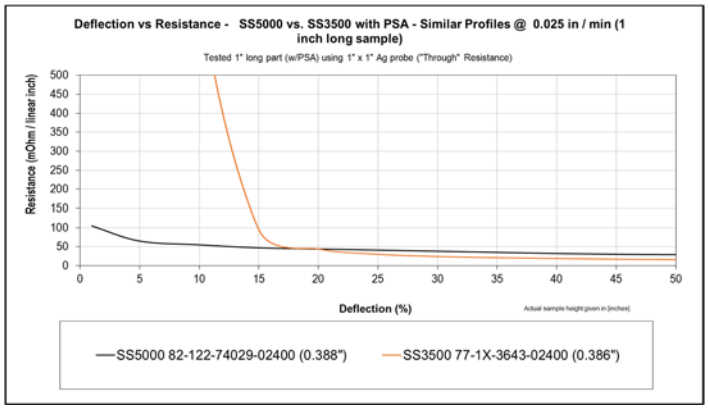
Graph 8B - Shielding Effectiveness
Soft-Shield 5000
P/N 82-122-74029-02400



Graph 8C - Compression – Deflection Comparison



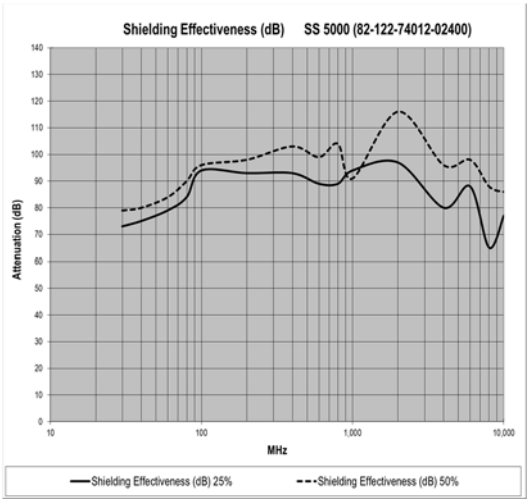
Graph 8D - Deflection vs Resistance Comparison



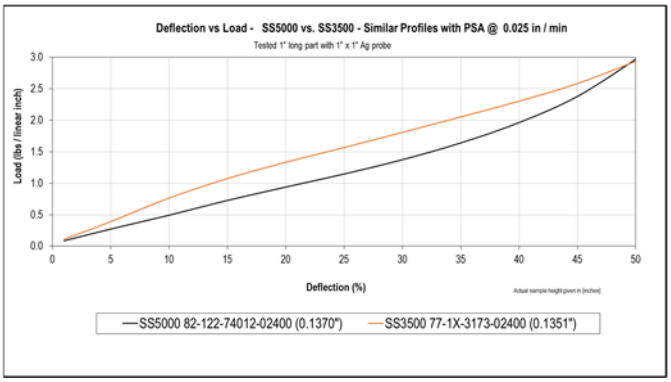
Test Data – Test Series #9

Graph 9A - Shielding Effectiveness
Soft-Shield 3500
P/N 77-12-3173-02400

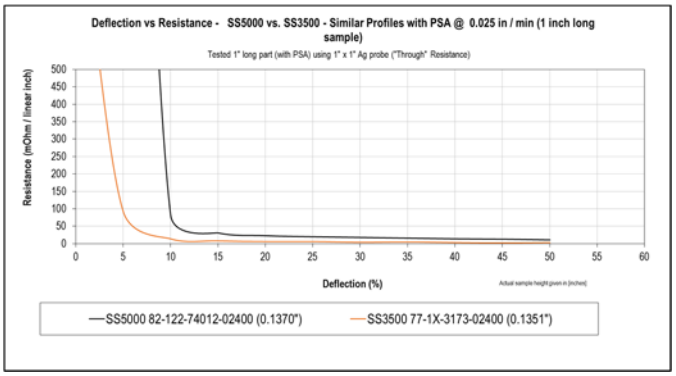
Graph 9B - Shielding Effectiveness
Soft-Shield 5000
P/N 82-122-74012-02400



Graph 9C - Compression – Deflection Comparison

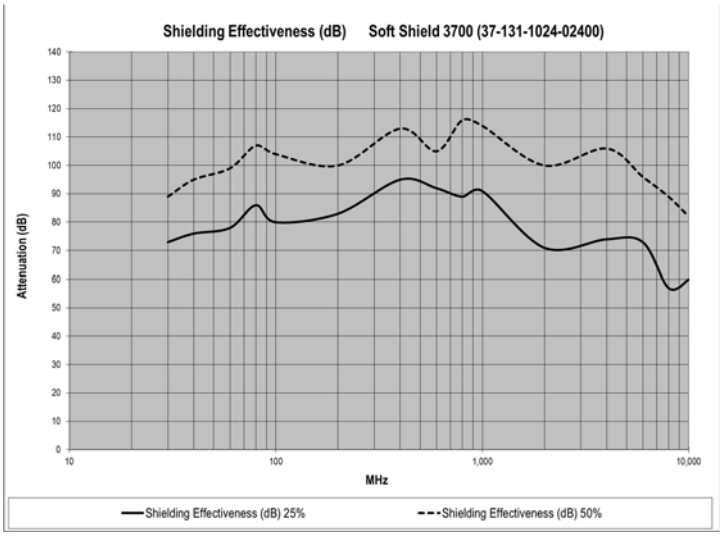


Graph 9D - Deflection vs Resistance Comparison



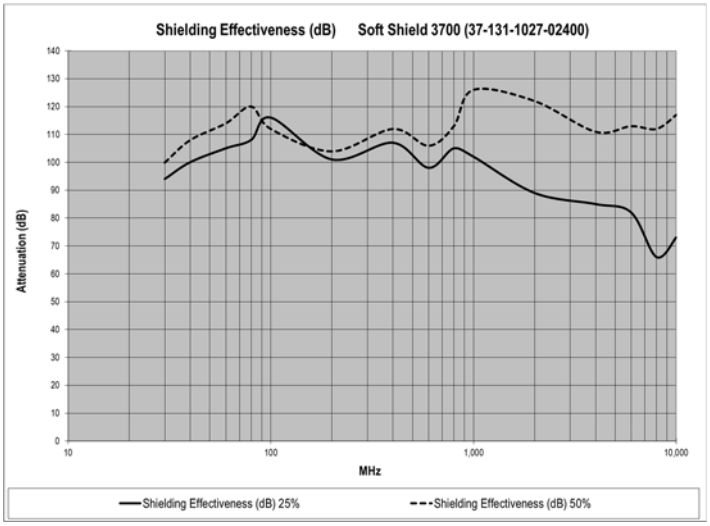
Test Data – Test Series #10

Graph 10A - Shielding Effectiveness
Soft-Shield 3700
P/N 37-131-1024-02400



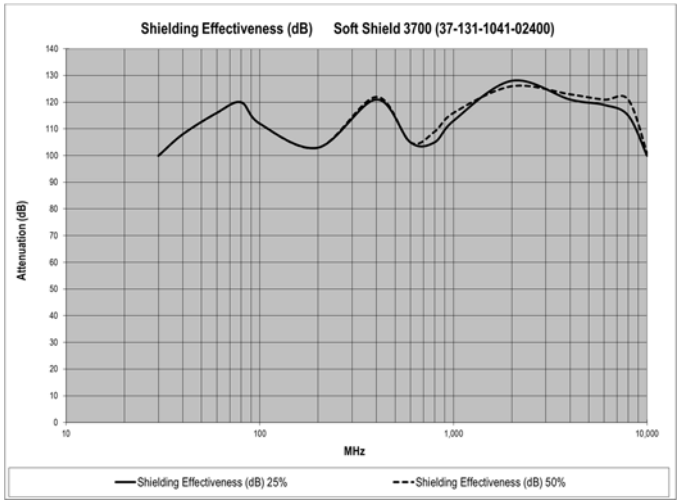
Test Data – Test Series #11

Graph 11A - Shielding Effectiveness
Soft-Shield 3700
P/N 37-131-1027-02400



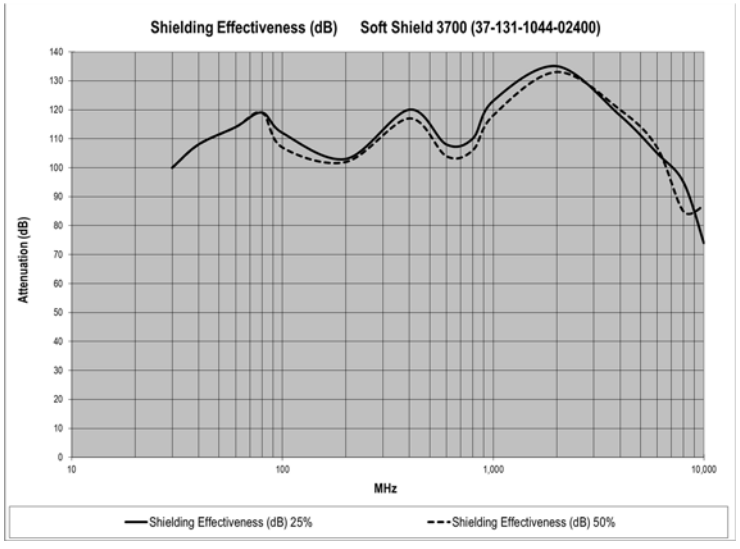
Test Data – Test Series #12

Graph 12A - Shielding Effectiveness
Soft-Shield 3700
P/N 37-131-1041-02400



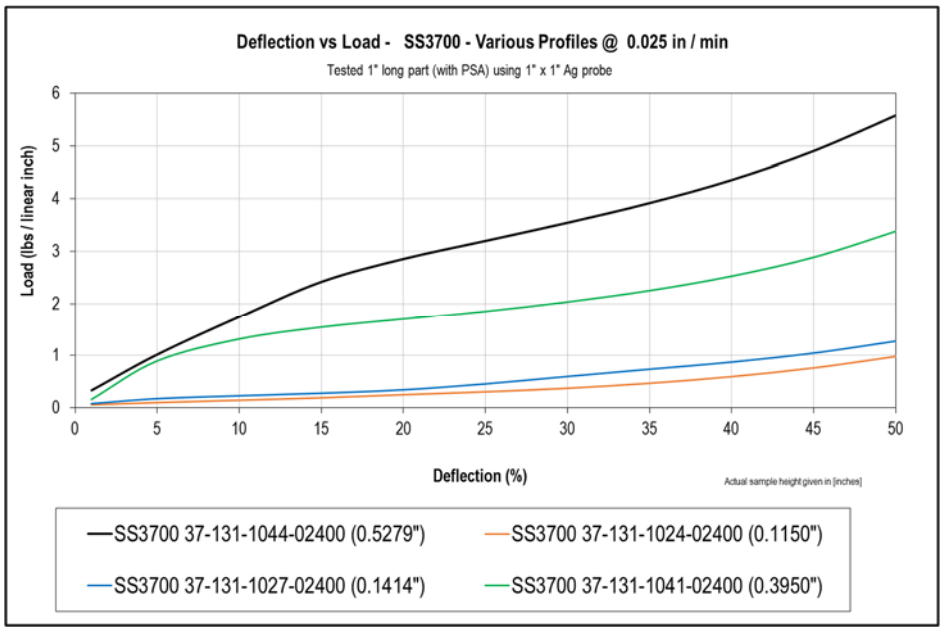
Test Data – Test Series #13

Graph 13A - Shielding Effectiveness
Soft-Shield 3700
P/N 37-131-1044-02400

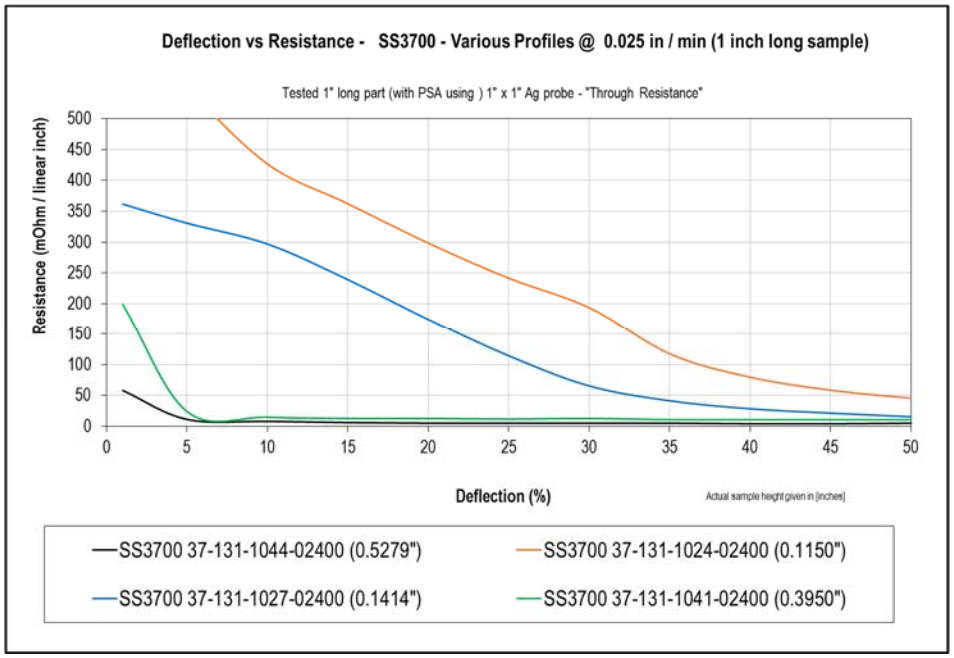


Test Data – Test Series #10 - 13

Graph 14 - Compression – Deflection Comparison
Soft-Shield 3700



Graph 15 - Compression – Resistence Comparison
Soft-Shield 3700



Compression Set Test Data

Table 1 - Soft-Shield 3500

Profile	Compression Set (%)
3102	25.3
3102	24.8
3150	4.6
3150	4.6
3176	4.4
3176	4.6
3607	34.2
3607	33.0
3622	7.6
3622	7.1
3667	6.4
3667	6.9
3626	8.5
3626	8.6
3643	5.3
3643	5.1
3173	4.3
3173	4.1

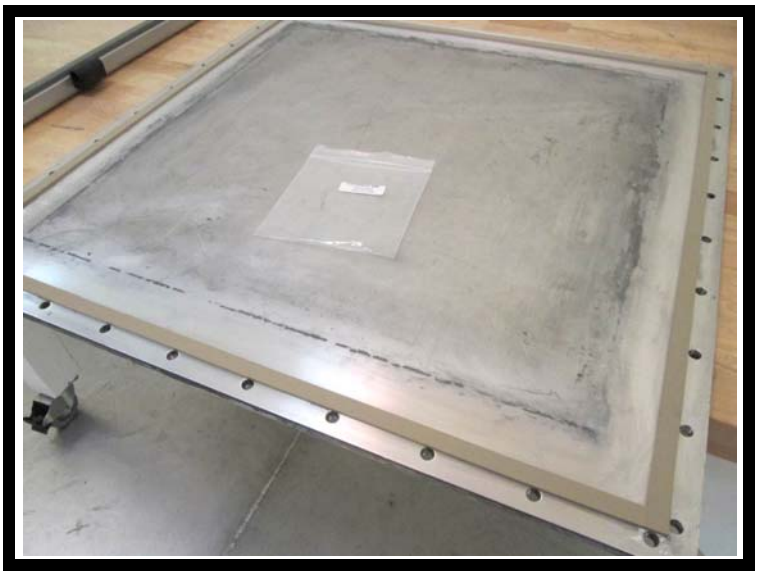
Table 2 - Soft-Shield 5000

Profile	Compression Set (%)
74018	4.0
74018	4.3
74024	5.2
74024	5.4
74028	3.0
74028	3.2
74037	10.0
74037	10.2
74074	4.2
74074	4.3
74058	10.6
74058	10.0
74011	5.2
74011	5.4
74029	3.0
74029	3.0
74012	3.5
74012	3.6

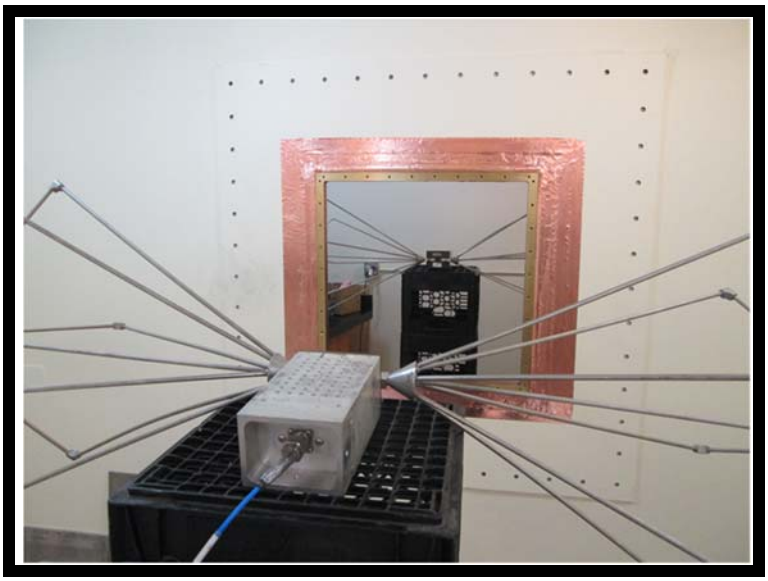
Table 3 - Soft-Shield 3700

Profile	Compression Set (%)
1044	1.3
1044	1.4
1024	7.0
1024	5.6
1027	2.4
1027	3.2
1041	2.1
1041	2.3

2.6 Shielding Effectiveness Photographic Documentation



Gasket Applied to Test Plate



Open Reference Test Setup 200MHz to 1GHz

Open Reference Test Setup 200MHz to 1GHz

Open Reference Test Setup 1GHz to 10GHz

Closed Measurement Setup 1GHz to 10GHz